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TRAFFIC ENGINEERING BRANCH

ANNUAL REPORT 1987

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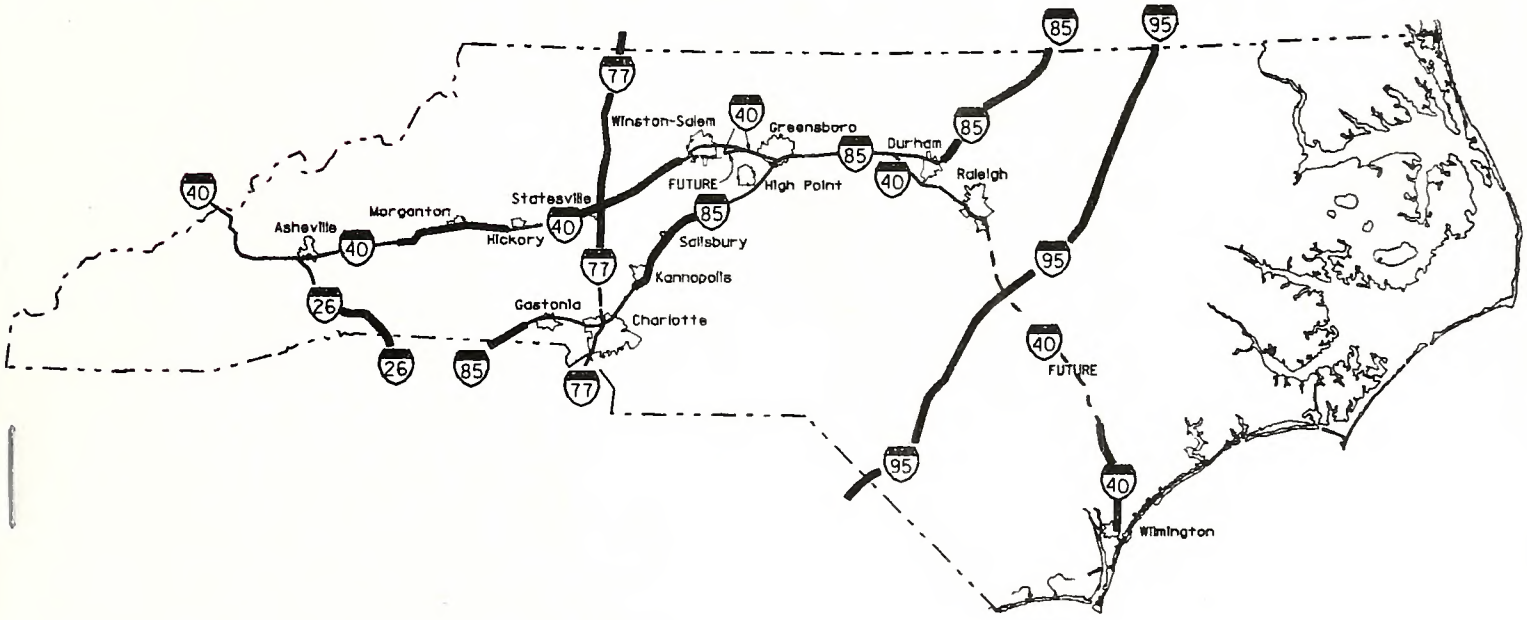

DIVISION OF HIGHWAYS

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1987

TRAFFIC ENGINEERING BRANCH

Annual Report

Division of Highways
Department of Transportation
Prepared by: Traffic Studies Unit

ACKNOWLEDGMENTS

The Traffic Engineering Branch wishes to express its gratitude for the cooperation and help of all the branches in the Division of Highways that contributed to our efforts in 1987.

We also would like to recognize the agencies outside of the Division of Highways who helped to make our accomplishments possible. Some of these are:

The Federal Highway Administration
The Governor's Highway Safety Program
The Division of Motor Vehicles (particularly the Traffic Records Section)
The Highway Patrol Division
The UNC Highway Safety Research Center

Table of Contents

	Page
INTRODUCTION	1
ORGANIZATION AND RESPONSIBILITIES	2
TECHNICAL OPERATIONS	6
Traffic Control Unit	7
Signals and Geometrics Unit	11
Signing Unit	13
Stenographic Pool	16
FIELD OPERATIONS	17
Signals Management Unit	18
Traffic Studies Unit	23
Field Support Squad	28
Area Traffic Engineering Unit	30
DIVISION TRAFFIC SERVICES UNITS	33
PROFESSIONAL ACTIVITIES	35

INTRODUCTION

The Traffic Engineering Branch's accomplishments for 1987 emphasize the diversity of work required to meet the needs of all who use State road facilities.

The work performed is presented by unit, with professional activities listed alone. To indicate the role played by the 14 Highway Divisions throughout the State, the activities of the Division Traffic Services Units are also indicated. Activities for the year are enumerated wherever practical. Such figures, however, often represent only the results of extensive preparation and ground work, factors not easily quantified.

This Annual Report is intended to serve two purposes:

1. To furnish State Highway officials and others, information on the annual work of the Branch.

2. To explain the functions of the Branch to trainees, new employees, and other groups interested in the safe, efficient control of traffic on the streets of North Carolina.

ORGANIZATION AND RESPONSIBILITIES

The Traffic Engineering Branch, which is staffed to the Assistant State Highway Administrator of the Division of Highways, is responsible for safe and efficient traffic operations on the State Highway System - a system that consists of 12,207 miles of Interstate and rural primary US and NC numbered routes; 59,312 miles of rural secondary routes; and 3,140 miles of urban routes, for a total of 76,582 miles.

Some of the specific duties of the Branch are as follows:

1. Development of policies for the use of pavement markings, signalization, channelization, driveway and street entrances, medians, speed zones, highway routing, and parking regulations.

2. Preparation of geometric and traffic signalization designs to improve the safety and traffic capacity at problem locations, and to establish optimum traffic signal timing.

3. Analysis of types of accidents, accident severity, and locations having high accident frequency, in order to reduce these factors, and relieve traffic congestion.

4. Development and implementation of various traffic safety programs including Federal Highway Safety Programs and Projects as they apply to the state of North Carolina.

5. Development and maintenance of uniform policies for the traffic engineering work performed by the 14 Division Traffic Services Units.

6. Investigation of requests, complaints, and suggestions for traffic operations and Safety improvements.

7. Preparation of traffic control plans to ensure traffic safety for all construction projects.

8. Provision of technical advice and assistance to municipal officials and local governing bodies, upon request.

9. Management of funds used for the historical marker program on state roads in cooperation with the Department of Archives and History.

There are 121 positions in the Traffic Engineering Branch as shown on the organization chart on page 6: 58 traffic engineers, 43 engineering technicians, 1 traffic control shop supervisor, 9 electronic technicians, 1 statistical research assistant, 1 administrative secretary and a staff of 8 clerical support personnel.

The Traffic Engineering Branch is organized into two major functions: Field Operations and Technical Operations. These functions are designed to provide a centralized, technical policy-making and design staff (based in Raleigh) and a field traffic engineering staff to implement statewide programs. The following is a brief description of the work done in these areas:

TECHNICAL OPERATIONS

TECHNICAL OPERATIONS GROUP is a centralized design, technical, and administrative group which provides traffic engineering plans for construction of improvements, promotes uniform traffic engineering practices standards, and policies statewide, and provides administrative services. This Group is subdivided into three units and a Stenographic pool, as shown below.

The Traffic Control Unit prepares traffic control plans for contract construction and maintenance projects involving construction phasing, construction methods, and traffic control devices to safely and efficiently handle traffic in work zones. This Unit is also responsible for pavement marking.

The Signals and Geometrics Unit prepares traffic and geometric design plans for Spot Safety improvements and traffic signal designs for contract installation. This Unit also coordinates the preparation of agreements and plans for the installation of railroad-grade crossing signals.

The Signing Unit prepares sign design plans (including sign lighting) for contract construction projects, and reviews requisitions for signs and sign materials installed by Division Traffic Services.

The Stenographic Pool is responsible for all clerical and centralized word processing for the Branch. The Pool is also responsible for processing purchase requisitions, securing assistance in maintaining equipment, maintaining office supply inventories, and maintaining the central files.

FIELD OPERATIONS

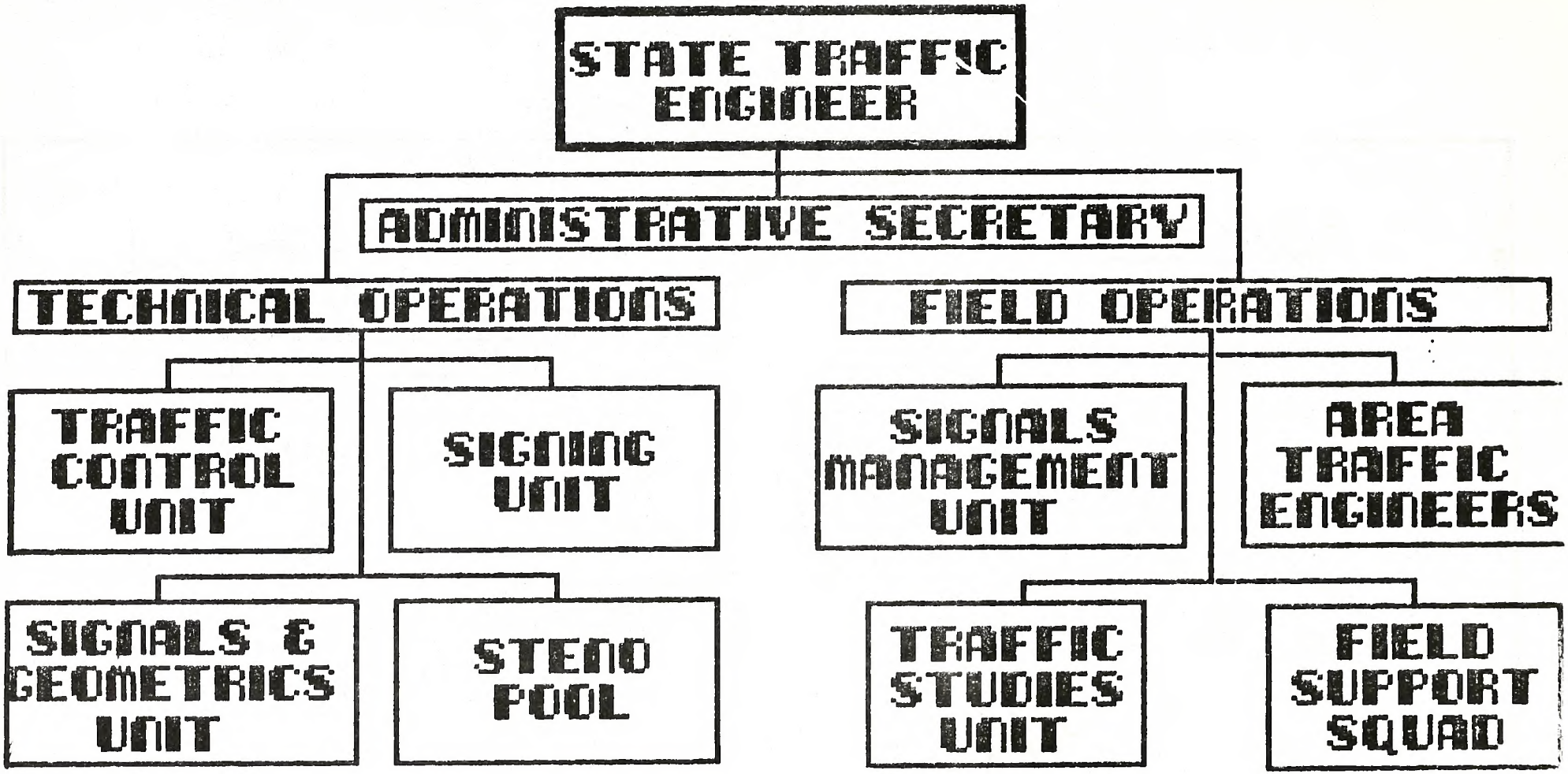
FIELD OPERATIONS consists of a Raleigh Office Signals Management Unit, Traffic Studies Unit, three Area Traffic Engineering Units located in Wilson, Winston-Salem, and Asheville, and a Field Support Squad.

The Signals Management Unit optimizes the timing and operation of traffic signals and signal systems, and prepares traffic signal specifications. This unit also is involved in the inspection of traffic signal and railroad crossing signal installations.

The Traffic Studies Unit serves as a liaison between the field units, the technical operations function, other branches within the Division of Highways, various state and federal agencies and the public in general. Reviews roadway plans in the preliminary and advanced stages of design; and reviews driveway permits for major traffic generating locations. Other duties include performing special traffic engineering projects, conducting evaluations on traffic control devices, maintaining the Branch Technical Library, coordinating technical meetings and training activities, and publishing technical materials, including this report.

Each Area Traffic Engineering Unit has one or more traffic engineers, who investigate and recommend improvements at locations on the State Highway System which are experiencing traffic operational and safety problems, including locations identified on the various Highway Safety programs. The three Area Traffic Engineers work closely with the 14 Division Traffic Engineers located throughout the State (see map, page 6, "Area Traffic Engineering Unit Area Assignments"), providing technical advice, interpretation of policy, and technical assistance.

The Field Support Squad provides administrative staff engineering assistance to the Assistant State Traffic Engineer (Field Operations) in carrying out the functions of Field Operations and serves as a liaison between Field Traffic Engineers and the Raleigh Office.



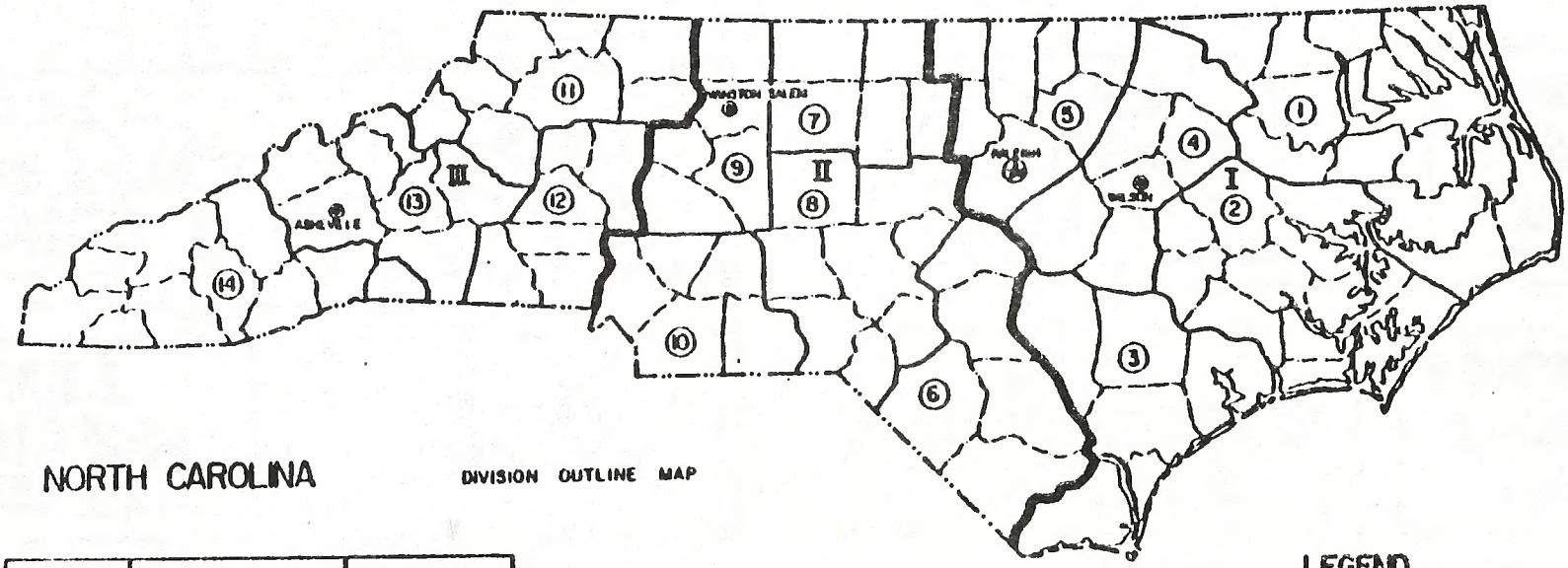
Traffic Engineering Branch
Organization Chart

North Carolina Department of Transportation
Division of Highways

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

TRAFFIC ENGINEERING BRANCH

AREA ASSIGNMENTS



NORTH CAROLINA DIVISION OUTLINE MAP

AREA	OFFICE	DIVISIONS
I	WILSON	1,2,3,4,5
II	WINSTON-SALEM	6,7,8,9,10
III	ASHEVILLE	11,12,13,14

LEGEND

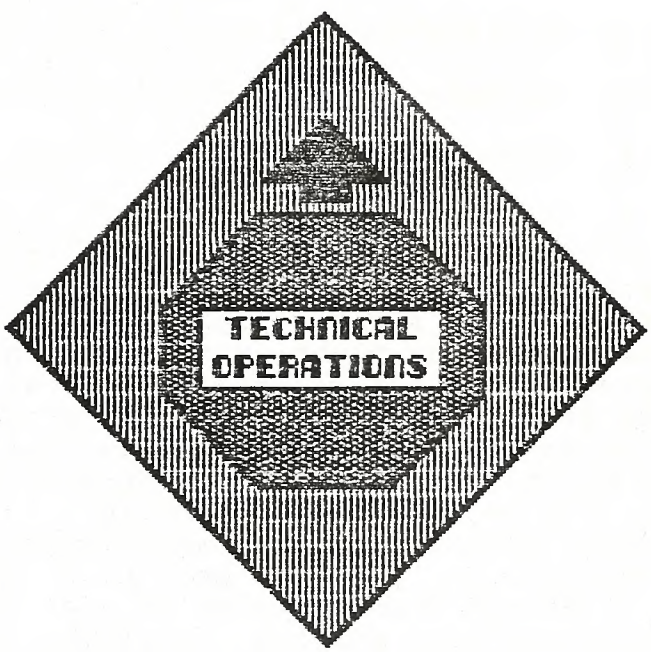
- COUNTY LINE
- DIVISION LINE
- AREA LINE
- AREA OFFICE

TECHNICAL OPERATIONS GROUP

Technical Operations Group is managed by the Assistant State Traffic Engineer (Technical Operations), the Group consists of three Units and a Stenographic Pool as shown below.

1. Traffic Control Unit
2. Signals and Geometrics Unit
3. Signing Unit
4. Stenographic Pool

They are all located in the Thompson Building in Raleigh. The Units are responsible for developing preconstruction traffic engineering designs plans, specifications, standards, and engineering estimates (PS & Es) highway projects. This involves the use of all traffic control devices including work zone traffic control. The Stenographic Pool is responsible for all clerical and centralized word processing for the Branch. The Pool is also responsible for purchase requisitions, securing assistance in maintaining equipment, office supply inventories, payroll, and maintaining the central files. A detailed description of each unit and their accomplishments during 1987 follows. Activities for each unit are also enumerated for the years 1983-1987. The activity charts show semi-annual quantities as well as annual totals where practical.


TECHNICAL
OPERATIONS

TRAFFIC CONTROL UNIT

Purpose:
This unit was formed in the late 1970's in direct response to Federal Highway Notice N-5000.7 which requires all highway construction projects involving Federal Highway Funds have a Traffic Control Plan (TCP) to protect workers and safely guide motor vehicles in a roadway construction workzone. As an extension of this directive, the North Carolina Department of Transportation also requires a TCP plan for all State-Funded roadway construction projects. Secondary responsibilities of the Traffic Control Unit include developing Roadway Pavement Marking and Delineation plans for all Federally and State Funded roadway construction projects to safely guide motor vehicles along the North Carolina system; providing guidance, standards, and policies on Traffic Control, Roadway Pavement Marking, and Delineation Plans to all other branches of the Division of Highways, Departments of State Government, Municipalities, Utility Companies, and Private Engineering Firms pertaining to any work being performed in the Highway Right-of-Way.

Personnel:
This unit consists of the following personnel complement:

One Traffic Control Engineer	- (HE III)
Three Traffic Control Project Engineers	- (HE II)
Six Traffic Control Design Engineers	- (HE I)
Twelve Traffic Control Design Technicians	- (ET III)
Four Traffic Control Technicians	- (ET II)

Organization Changes:
No changes

Activities and Accomplishments:
In 1987, the Traffic Control Unit prepared 205 traffic control plans and completed revisions to 75 plans after letting to contract. The Traffic Control Unit attended 103 field inspections and 87 related project construction meetings.

Special assignments completed over the past year:

Developed:
... Series A350 Pliant Polymer Pavement Marking Material specification
... Bisymmetric 1.75 Grade Pavement Marking, Series 320 specification
... 4 Year Performance Pavement Marking Specification

... Alternate Bid for 2 types of Long-Life Pavement Marking Materials
on I-10DE and I-10DD (Johnston County)

- Bisymmetric 1.75 Grade Pavement Marking

- Epoxy Pavement Marking

... Alternate Bids for 2 types of Recessed Reflective Pavement Markers

- 1) Standard Recessed Markers

- 2) Stimsonite 948™ - wider marker

... ReflexiteTM Concrete Barrier Delineators, microprismatic sheeting -

- permanent installation (top-mounted) on I-806, 807, and 808A

- test project on I-9AA (Orange County)

Completed:

... Parts III and IV of the North Carolina Supplement to the MUTCD (mailed to all pertinent DOT personnel)
... Traffic Control updates to NCDOT Utility Manual
... Revised Force Account Estimate Policy in relation to Traffic Services
... Estimate (TCP and Marking) of the cost of completing the Appalachian Development Highway System
... Roadway Delineation of guardrail, barrier and roadside, previously a Signing Unit item, is now the responsibility of the Traffic Control Unit. Revisions have been made to the State Delineator Policy, Specifications, Standard Drawings and Pay Items.

Computer Aided Drafting and Design (CADD) System:

... Trained 10 CADD Operators proficient in completion of pavement marking plans
... Revised individual cells in cell library in the CADD in order to minimize elements in each cell thus making generation time quicker
... Created a Traffic Control Matrix Menu for use in drawing Roadway Standards and Traffic Control Typicals
... Created a series of cell library tutorials to speed up plan production
... Produced 10 user commands to speed up plan production, minimize operator input, decrease possibility of errors and achieve more consistent plans

... Spartacus time-management system for TCP unit and has been adopted by Traffic Engineering Branch and replaces FR-01
... Manpower spreadsheet for TIP/Production Projects 1988-1995 and has been adopted by some units in the Traffic Engineering
... Pre-Construction Engineering Management Systems flow chart showing relation of Traffic Engineering in relation to DOT

Filmed:

... Safe Hit Delineation Post Demonstration
... Application and evaluation of Metromark™ Material, Divisions 6 and 8
... Stand-Alone pavement markers on Project B-2177

Test Projects:

... Including Thermoplastic Pavement Marking Lines and Symbols on State Resurfacing Contracts (Divisions 6 and 9)

... 4-Year Performance Pavement Marking Contract on I-119B (I-85, Rowan County)

... Quickchange™ Movable Barrier with Transfer Vehicle test project on I-2104 (Mecklenburg County)

... Potters™ Large Reflective Glass Bead in Pavement Marking test project on I-119B (I-85, Rowan County)

... Renco™ Ceramic Reflective Markers on W-1053 (US 64, Wake County)

... Mini-Drum Delineators on Concrete Barrier on I-301BB (Gaston and Mecklenburg Counties) and W-1054 (Wake County)

... Errant Vehicle Portable Loop Detector test project on I-2107 (Mecklenburg County)

... Poly-Carb™ Epoxy Pavement Marking Material, installed on concrete on I-817 (I-95, Johnston County)

... Variable Message Matrix Signs -

- Tele-Spot™ Dot Matrix Sign on I-10DC (I-95, Johnston County)

- Wink-O-Matic™ Dot Matrix Sign at State Fairgrounds

- WAVS™ Bulb Matrix Sign on I-1026 (Durham County)

... Stand-Alone™ Reflective Pavement Markers used to replace pavement marking lines in a temporary situation on B-2177 (Wake County), and U-615 (Wilkes County)

TRAFFIC CONTROL UNIT

ACTIVITY DESCRIPTION	1983	1984	1985	1986	1987
1. TCP Design and Final Field Inspection Meetings	(--)	(150)	(103)	(98)	(87)
2. Long-life Pavement Plans	(--)	(24)	(22)	(22)	(31)
3. Snowplowable Pavement Plans	(--)	(23)	(13)	(18)	(29)
4. Preconstruction & Constr. Conferences Attended	(35)	(15)	(21)	(24)	(30)
5. Highway Construction Plans Reviewed	(26)	(70)	(94)	(39)	(53)
6. Preparation of Traffic Control Plans for Construction Zones	(143)	(146)	(217)	(157)	(190)
7. TCP Field Investigations	(48)	(125)	(65)	(59)	(67)
8. Construction Reviews	(51)	(28)	(38)	(72)	(75)
9. Pre-bid Conferences	(2)	(2)	(5)	(7)	(8)

SIGNALS AND GEOMETRICS UNIT

Purpose:
The Signals and Geometrics Unit prepares plans, estimates, and specifications for the installation of traffic signals; prepares plans for modifying existing highway intersections; and prepares and reviews plans and agreements for the installation of railroad grade crossing signals.

Personnel:
The unit has a personnel complement of twelve highway engineers and eleven engineering technicians. These are divided into six squads: five Signals and Geometrics Design Squads and one Railway-Highway Grade Crossing Signals Squad.

Organization Changes:
None.

SIGNALS AND GEOMETRICS DESIGN SQUADS

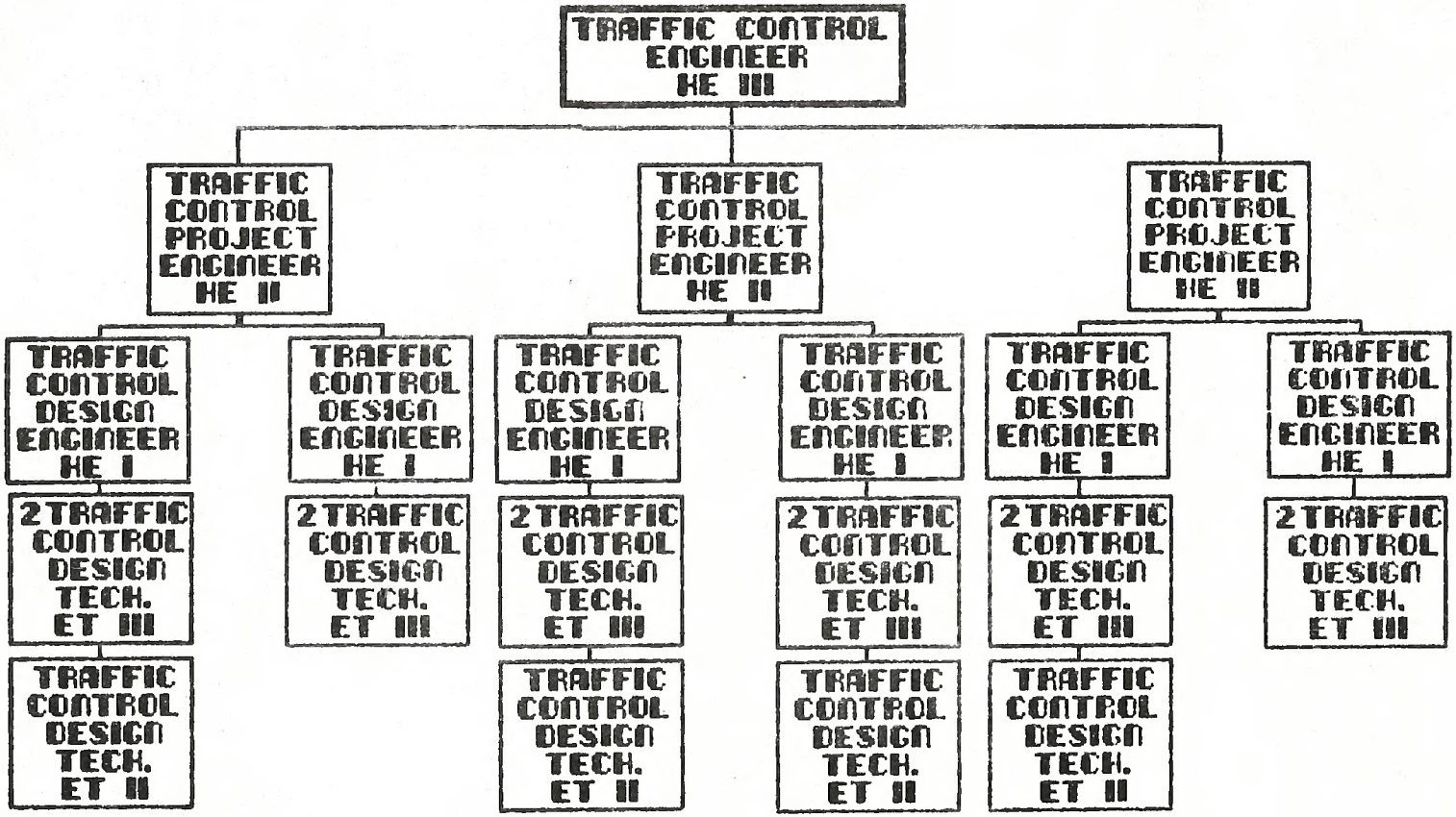
Activities and Accomplishments:
The Signals and Geometrics Design Squads prepare traffic signal plans, and some intersection geometric designs. This work often requires them to do stadia surveys; however, at times, the DOH Locations Unit will make these necessary surveys. The preparation for final designs is coordinated with groups such as Area Traffic Engineers, the Right-of-way Branch, the Utilities Section, the Roadway Design Unit, municipal government officials, and others.

RAILWAY-HIGHWAY GRADE CROSSING SIGNALS SQUAD

Activities and Accomplishments:
This squad is responsible for the preliminary engineering of all railway-highway grade crossing signal projects.

Squad responsibilities include: administration of the funding and scheduling of railway-highway grade crossing signal projects in the Transportation Improvement Program; designing the proposed grade crossing signal installation; coordinating the detail design with the railroad companies involved; preparing the necessary municipal and railroad company agreements; preparing contract specifications; reviewing and approving final plans, estimates and materials lists; authorizing the Railroad Company to construct the railway-highway grade crossing signalization projects; and providing recommendations to those responsible for selecting railway-highway grade crossing projects.

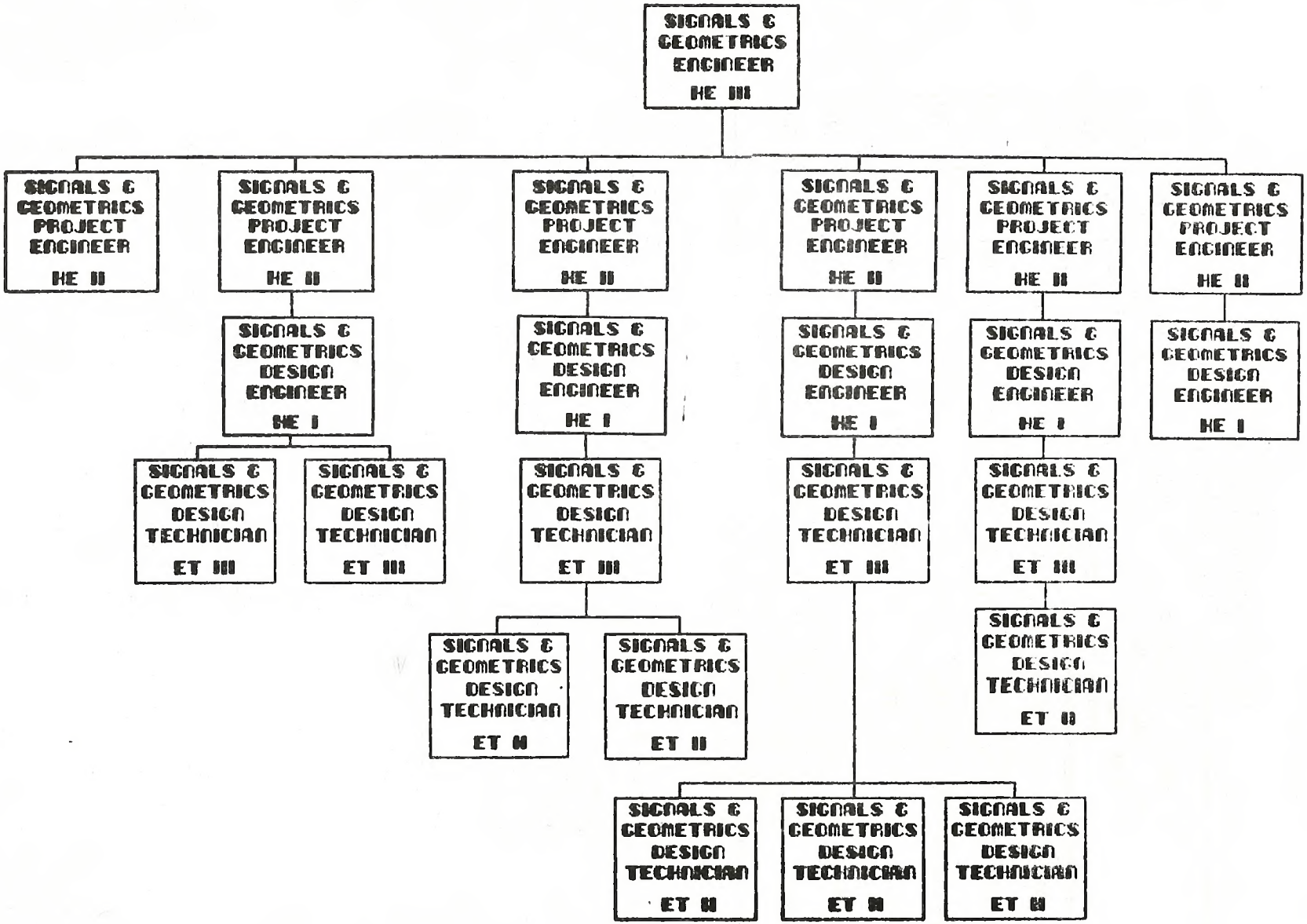
In 1987 the Squad completed the preliminary engineering on and authorized construction of 57 projects. This total included 47 Federal-Aid Safety Program Railroad Grade Crossing projects and the railroad grade crossing signalization portions of 9 Highway Construction projects and 1 division traffic signal installation.



ORGANIZATION CHART
TRAFFIC CONTROL UNIT

SIGNALS AND GEOMETRICS UNIT

ACTIVITY DESCRIPTION	1983 JAN. -JUN	1983 JULY -DEC. (TOTAL)	1984 JAN. -JUN	1984 JULY -DEC. (TOTAL)	1985 JAN. -JUN	1985 JULY -DEC. (TOTAL)	1986 JAN. -JUN	1986 JULY -DEC. (TOTAL)	1987 JAN. -JUN	1987 JULY -DEC. (TOTAL)
1. Signal (only) Designs		(295)		(313)		(388)		(438)		(357)
2. Geometrics (only) Designs		(65)		(78)		(147)		(44)		(49)
3. Geometrics/Signal Design		(17)		(23)		(12)		(21)		(29)
4. Stadia Surveys		(44)		(55)		(74)		(84)		(73)
5.Signal System Projects										(83)
6.Controler Replacement Project										(393)



ORGANIZATION CHART
SIGNALS & GEOMETRICS
UNIT

SIGNING UNIT

Purpose:
The Signing Unit designs and prepares detailed plans for signs and sign lighting; develops standard sign designs and maintains records on standard signs used by the Division of Highways; and designs and maintains signing standards for the use and placement of highway signs on the public roads and streets.

Personnel:
The Unit consists of the following personnel complement:

1	Signing Engineer	-(HE III)
2	Signing Project Engineers	-(HE II)
3	Signing Design Engineers	-(HE I)
6	Signing Design Technicians	-(ET III)
1	Signing Technician	-(ET II)

Organization Changes:
No position changes were made in 1987.

Activities and Accomplishments:
In 1987, the Unit ordered personal computers for the three new employees added in 1986. The additional computers arrived at the end of 1987 and will be installed and integrated into the daily work of the Unit. All signs and ground-mounted supports are now computer designed; project cost estimates are prepared on the computers; and necessary project specifications are prepared using word processing software.

The Unit has full-time access to one Intergraph CADD work station. Employees have continued to design standard drawing cells which will be used to increase the speed of drawing project plans. In addition, user commands, tutorials, and specialized menus have been developed to greatly speed up the signing plan development on CADD. The impact of the CADD drafting and design system was expected to greatly increase efficiency of the Unit in 1986, however, development of standard cell libraries and user commands have been much more time consuming than originally anticipated, slowing the Units' conversion to CADD produced plans. The groundwork is now in place to rapidly convert our drafting operations over to CADD.

PS&E packages were prepared for signing projects while close communications were maintained with field personnel. The Signing Unit prepared plans for 48 signing projects over the past year.

Some of the major tasks completed during the past year are as follows:

... Developed additional microcomputer applications to aid in

the process of sign design, support designs, lighting design, and cost estimates.

... Maintained computerized data bases for current signing projects and signing plans on file.

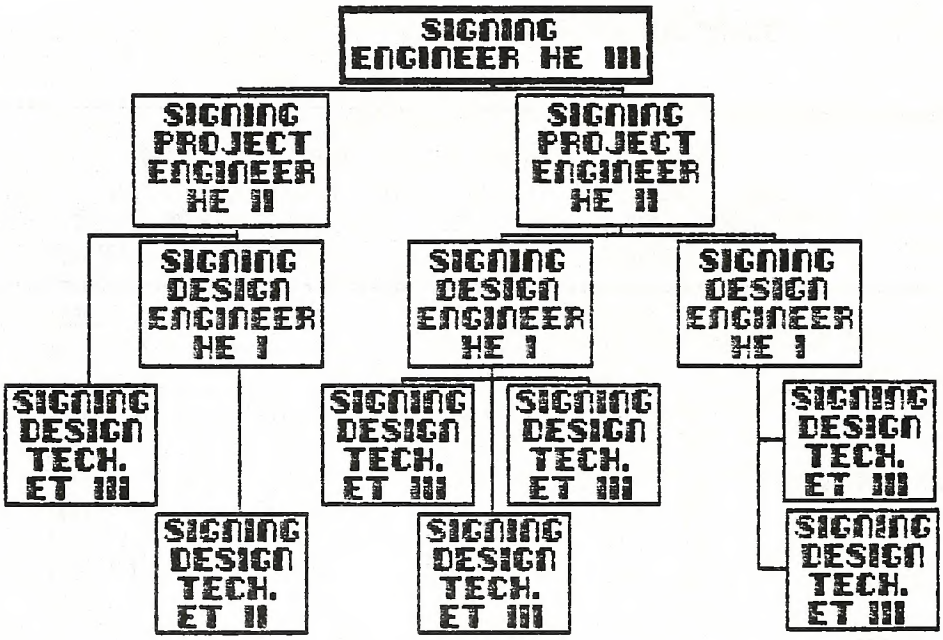
... Developed and Installed several user commands, tutorials, and specialized menus for standard sign drafting on Intergraph CADD hardware.

... Utilized Intergraph CADD work station to draw complete sets of signing plans for contract work as well as design diagrammatic signs, draw overhead sign structure cross-sections, and design special signing related items for contract signing plans prepared in the normal manner.

SIGNING UNIT ACTIVITIES

ACTIVITY DESCRIPTION	1983 JAN.-JUN.	1983 JULY-DEC. (TOTAL)	1984 JAN.-JUN.	1984 JULY-DEC. (TOTAL)	1985 JAN.-JUN.	1985 JULY-DEC. (TOTAL)	1986 JAN.-JUN.	1986 JULY-DEC. (TOTAL)	1987 JAN.-JUN.	1987 JULY-DEC. (TOTAL)
1. Requisitions Processed **		(513)		(441)		(**241)		(205)		(381)
2. Number Signs Designed for Requisition & Others		(403)		(432)		(462)		(731)		(1079)
3. Number of Supports Designed for Requisitions & Others		(33)		(57)		(55)		(28)		(19)
4. Full-Scale Drawings Completed		(41)		(23)		(17)		(5)		(15)
5. Full-Scale Drawings Revised or Redrawn		(7)		(11)		(5)		(0)		(5)
6. Contract Projects Completed		(18)		(20)		(22)		(16)		(48)
7. Contract Projects Incomplete		(6)		(12)		(9)		(26)		(50)
8. Signs Sized & Layouts Made for Projects		(NA)		(789)		(777)		(411)		(1519)
9. Number of Overhead Supports Designed		(18)		(43)		(45)		(49)		(58)
10. Number of Overhead Lighting Systems Designed		(18)		(39)		(40)		(46)		(71)
11. Projects for which Catalog Cuts Approved		(7)		(7)		(10)		(11)		(13)
12. Catalog Cut Approval for Sign Lighting		(--)		(16)		(19)		(12)		(20)
13. Contract Cost Estimates Made		(--)		(50)		(58)		(18)		(76)
14. Contract Requisition Preparations		(--)		(21)		(15)		(11)		(32)

**Note: Requisitions for standard signs are no longer processed by the Signing Unit.



ORGANIZATION CHART
SIGNING UNIT

STENOGRAPHIC POOL

Purpose:
The Stenographic Pool is responsible for certain clerical and centralized word processing work for the Branch. The Pool is also responsible for processing all purchase requisitions, securing assistance in equipment, office inventories, and maintaining the central files.

Personnel:
This Pool consists of one Clerical Supervisor IV, two Word Processor III's, and one Typist III, and Receptionist II.

Organization Changes:
Based on the Division of Highways Reorganization Plan for the Branch approved in December, 1987, the previous Administrative Unit was eliminated and a Stenographic Pool has been established under the Technical Operations Group. A Receptionist II position has also been added to the Pool.

Activities and Accomplishments:
This Pool performs various administrative duties, as shown below:

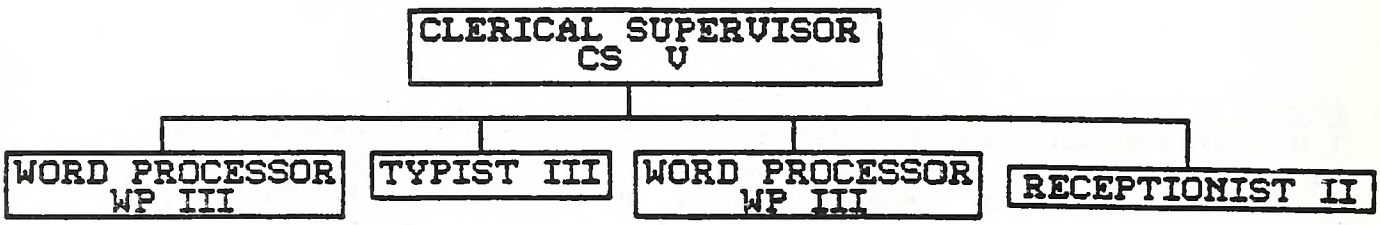
... Typing letters, memoranda, and reports.

... Filing and typing all purchase requisitions.

... Processing all requests for travel and travel advances; and helping employees with moving procedures, motor pool car requests, equipment rentals, workmen's compensation forms, job reports and payroll time, and office supplies.

... Serving as receptionist for the branch, with all calls coming through the central office.

... Maintaining the central files.



ORGANIZATIONAL CHART
STENOGRAPHIC POOL

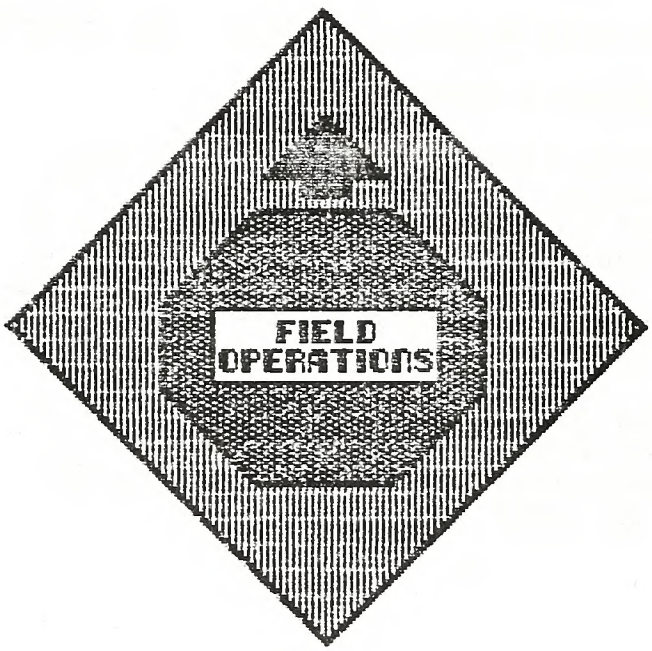
FIELD OPERATIONS GROUP

Field Operations is under the direction of the Assistant Manager of Traffic Engineering (Field Operations), and consists of the following units:

1. Signals Management Unit
2. Traffic Studies Unit
3. Area Traffic Engineering Units (3 groups)
4. Field Support Squad

These units provide field traffic engineering services throughout the state. In accomplishing their respective duties, the staff is in frequent contact with public officials, citizens, and Division personnel. As a result, they are in an excellent position to promote good public relations and an understanding of the Division of Highways' objectives on the local level.

Activities of the Signals Management Unit and the Traffic Studies Unit are enumerated for the years 1983-1987. Activities of each Area Traffic Engineering Unit are enumerated for the year 1987.


FIELD
OPERATIONS

SIGNALS MANAGEMENT UNIT

Purpose:
The Signals Management Unit is responsible for the acquisition, application, installation, maintenance and optimization of traffic signal equipment installed on the highway system. The unit develops specifications, provides technical support and pursues an ongoing program of optimization of signals on the highway system. The Unit also administrates railroad grade-crossing projects from construction to final inspection.

Personnel:
The Unit is staffed directly to the Assistant State Traffic Engineer Field Operations and its personnel complement is as follows:

1 Signals Management Engineer	-(HE III)
1 Signal Systems Engineer	-(HE II)
1 Signal Equipment Engineer	-(HE II)
1 Signal Equipment Field Service Engineer	-(HE I)
1 Signal Equipment Contract Engineer	-(HE I)
2 Signal System Engineers	-(HE I)
5 Signal Optimization Engineers	-(HE I)
1 Signal Equipment Contract Technician	-(ET III)
1 Railway-Highway Grade Crossing Signal Technician	-(ET III)
1 Signal Systems Technician	-(ET III)
2 Signal Equipment Technicians	-(ET II)
1 Traffic Control Shop Supervisor	-(TCSS)
9 Electronic Technicians	-(ELT I)

The Unit is divided into two functional groups: a Signal Systems Squad and a Signal Equipment Squad. The Signal Systems Squad being further divided into personnel responding to specific requests from the Highway Divisions (Signal System Project Engineers and Technicians) and the Signal Optimization Group which is systematically retiming all of the remaining intersections on the Highway System (Signal Optimization Engineers and Technicians).

Organizational Changes:
Ten additional positions were created in the Signal Optimization Squad thus allowing for conversion of 6 contract positions to full time permanent positions as of November 1, 1987. The fund from the Energy Division were extended to 1989 for continuation of the statewide optimization program and the activity was expanded to include system signals as well as isolated signals. Four of the existing contract employees filled the newly created positions to provide continuity to the program.

SIGNAL SYSTEMS SQUAD

Activities and Accomplishments:
The Signals Systems Squad is responsible for the optimization of both signals and signal systems on the State Highway System with a primary emphasis on helping motorists reduce fuel consumption, traffic congestion, and unnecessary delays. The Signal Systems Squad obtains recent traffic volumes, and inventories present intersection's characteristics and speeds. The new data is then analyzed, and new updated timings are determined. Using new timing plans and equipment inventories, final implementation is accomplished in concert with the Highway Divisions.

Studies are also conducted to determine if the interconnection of existing isolated signals will reduce vehicle operating costs.

Thirty-two signal retiming projects were active in 1987 of which sixteen were completed by the Signal System Project Group. Estimates of the reduction in stops, delays and of completed projects indicates an annual average operating cost savings of $85,500 per project. The construction costs per project ranged from $300 to $3,000. Studies completed during 1987 are as follows:

CITY	SYSTEM NAME
Asheville	US 25-25A-NC 81 Hendersonville Rd.-All Soul Rd. System
Belmont	Belmont CBD System
Boone	US 321 from intersection 11-027 to 11-0973 Shopping Center
Cary	Kildaire Farm Rd. System
	Walnut St. System
Clayton	US 70-NC42 at SR 1004 and SR 1563
Elkin	US 21 Bus Time Base Coordinator Programming
Greenville	US 13-NC 11 Memorial Drive Signal System
	US 264 Bypass System
Havelock	US 70 System
Kings Mountain	Kings Mountain CBD System
Lincolnton	Lincolnton CBD
Mooresville	CBD System
N. Wilkesboro	NC 268 Signal System from Collegiate (072) to Ramps (957)
Newton	Newton CBD System
Sanford	Carthage-Charlotte System, CBD
Taylorsville	Taylorsville CBD System
Wilson	Wilson CBD System
	Raleigh Rd.-Deans St. from Hines to Vance

Studies for the following projects are in progress:

CITY	SYSTEM NAME
Asheboro	CBD System
Chapel Hill	US 15-501 Bypass
Durham	US 70 at SR 1906 (Leesville Rd.)
Goldsboro	Berkeley Blvd. System
Kinston	US 70B-258 at NC 58, SR 1838; System Analysis
Laurinburg	CBD System
Lillington	US 401 CBD System
Raeford	CBD Signal System
Raleigh	US 64-70-401 at SR-1007, Beltline at Poole Rd.
	Wake Forest Rd. System
	Six Forks Rd. System
	US 70-401 South Wilmington St. from Pecan to Garner US 1 North Blvd. at Buffalo and New Hope Church Rd.
Shelby	Shelby CBD System
Thomasville	NC 109 System
Walkertown	NC 66 System

The Signal Optimization group, then a group of Four contract employees responsible for the retiming of isolated traffic signals, completed during 1987 the retiming of 352 intersections. The work resulted in an estimated annual operating cost savings of $11,454,478. Since the commencement of the contract optimization project 796 intersections have been retimed for an annual operating cost savings of $54,031,978.

SIGNAL EQUIPMENT SQUAD

Activities and Accomplishments:
The Signal Equipment Squad procures, evaluates, stocks and distributes traffic control equipment. It provides technical assistance to various agencies and administers railroad signal construction projects and maintenance payments to railroad companies for grade crossing maintenance. The squad also evaluates all equipment proposed by vendors. Additionally, the squad reviews all traffic signal equipment selected by the Signals and Geometrics Unit to assure that the equipment proposed can accommodate the developed design. When a special traffic signal function is required, the squad designs necessary circuitry and develops schematics to implement the special function.

During the past year, the squad assisted Division 6 in the contract administration of the construction phase of the City of Fayetteville computerized signal system. Operational testing of the completed system is scheduled to begin in late 1988. The estimated cost of this project is 2.4 million dollars and allows for central computer

control of 134 signalized locations.

The squad also assisted Division 13 and the City of Asheville in the bid review and selection of a close loop traffic control system. The construction is scheduled to begin in 1988. Cost of the system is $280,000 and includes 45 intersections with a centralized PC master for centralized timing plan changes and data acquisition.

In addition, the squad assisted the Cities of Raleigh and Gastonia in selecting consulting firms to conduct a feasibility study for the traffic system in Gastonia and for refurbishment of the existing Raleigh Computerized Signal System.

The squad assisted all 14 Divisions with the replacement of over 500 traffic signal controllers and cabinets as part of the statewide Signal Upgrade Program in 1987. This program will continue in 1988. Additional 2.5 million dollars being made available from the statewide maintenance allocation for continuation of the program.

In the area of railroad signal installations, eighty-one (81) grade crossing projects were completed during 1987 with a total billing of $2,539,891. Inspections were performed on all 81 completed projects. Construction stake-outs were performed at 8 construction sites at the request of the contractors.

Fifty-five (55) maintenance inspections were performed on railroad crossings and the squad processed $444,752 in maintenance payments to the railroads.

In addition to the major projects stated above, the squad worked on the following projects and programs:

... Performed 21 inspections of new signal installations and continued to develop policies and procedures for the Traffic Signal Inspection Program for all new installations on the highway system.

... Prepared designs and schematics for 107 "special functions" required by the Signals and Geometrics Unit.

... Reviewed 353 scratch requisitions for new signal installations and upgrades.

... Investigated 33 tort claims.

... Processed 93 signal equipment requisitions.

... Prepared the triannual signal equipment contract, reviewed bids and made recommendations for award to the Division of Purchase and Contracts. Approximately one million dollars worth of signal equipment is purchased from this contract annually.

... Reviewed 23 bids for traffic signal equipment and made specific recommendation for award.

... Had 1462 incidents of technical response to Highway Divisions and other agencies.

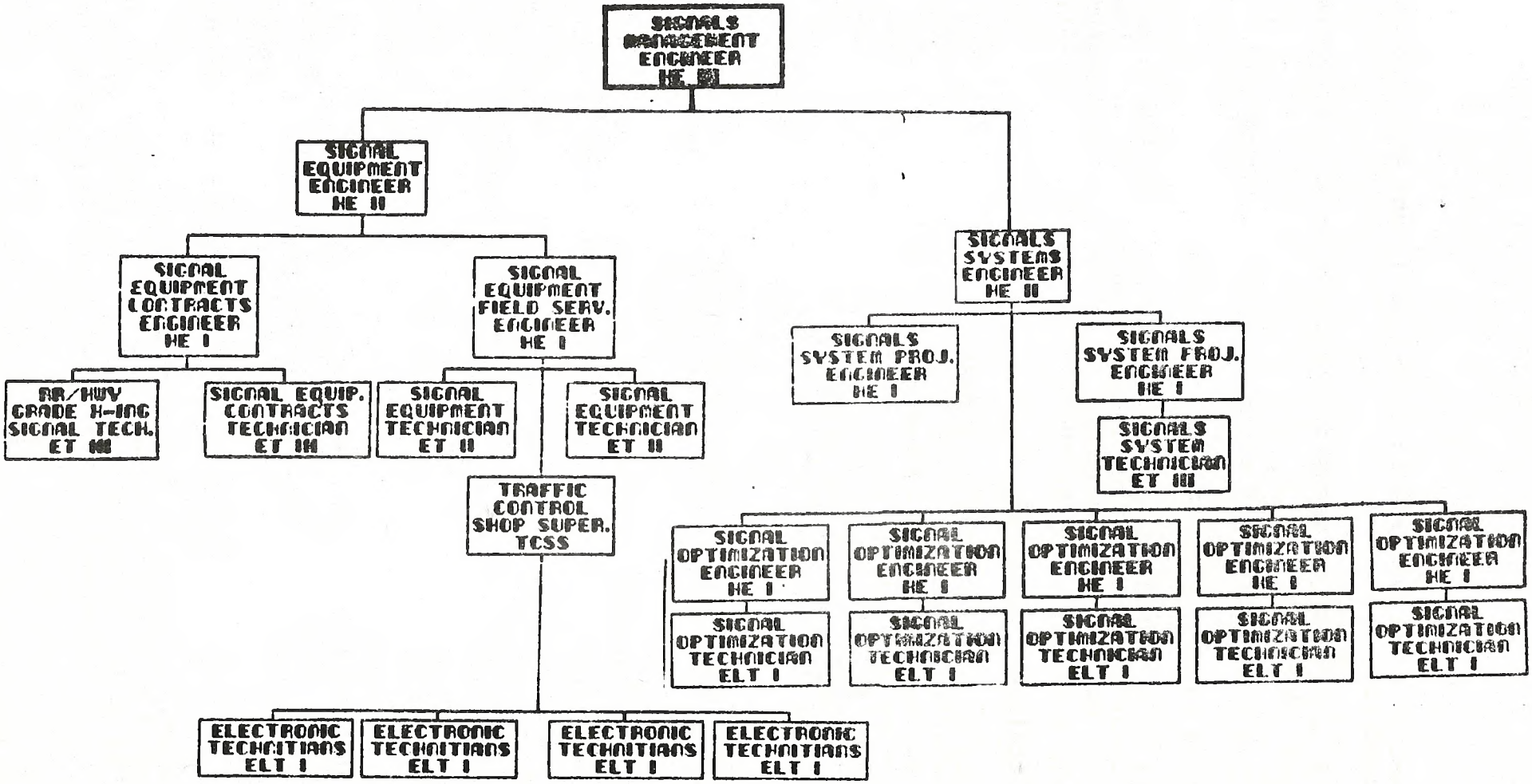
... Developed 8 estimates for signal construction projects.

... Processed 191 railroad invoices for payment.

During 1987, the Signal Equipment Squad, at its Central Repair Facility, spent in excess of $20,000 on replacement parts and spent an excess $12,000 on test equipment to better perform repairs. The following is a list of accomplishments of the Repair Facility:

Equipment Repaired

Solid State controllers/Assoc.		869
Electromechanical Controllers/Assoc.		1024
Accessory Control Equipment		672
Detector Amplifiers		938
Test Equipment		5
Cabinets (rewire and repair comp.)		8
Field Repairs in Divisions		17
	Total:	3533



ORGANIZATION CHART
SIGNAL MANAGEMENT
UNIT

TRAFFIC STUDIES UNIT

Purpose:
The Traffic Studies Unit is responsible for testing and evaluating traffic control and traffic safety devices, new materials and new traffic engineering methods for possible use on the State Highway System; performing special traffic engineering projects and programs; reviewing street and highway construction plans for traffic safety and operations problems; and reviewing Special Commercial Driveway Entrance Permit Applications.

This unit is responsible for performing accident studies to identify hazardous locations which have the greatest potential for accident reductions. Through these studies, highway safety improvement needs can be determined, and the effectiveness of installed treatments can be determined.

The unit is responsible for writing and Maintaining records of traffic ordinances, primary route changes, and municipal agreements.

Personnel:
The Traffic Studies Engineer is responsible for supervising the following major functions: Special Projects, Design Review, and Accident Studies.

The remainder of the staff is as follows: (1) An Engineering Tech III performs various special projects (2) A Highway Engineer II and a Highway Engineer I handling the design review work; (3) The Accident Studies Function is handled by an Accident Studies Engineer, three Engineering Technician IIs, one Statistical Research Technician II, one Records clerk V, and one Clerk-Typist II.

Organization Changes:
The Design Review Squad was reorganized with the upgrade of the Design Review Engineer to a HE II and an additional position of Design Review Project Engineer (HE I) added. The Engineering Technician I position was removed from this squad The Traffic Ordinance Clerk was assigned to the unit and staffed in the Accident Studies section.

SPECIAL PROJECTS

Activities and Accomplishments:
The Special Projects Function includes a variety of

engineering studies, investigations, and reports. Normally, these projects fall into one of the following categories: Traffic Control Devices Evaluation, Pavement Marking Projects, and Administrative Staff Engineering Services.

During 1987, the following Special Projects were conducted:

... Conducted pre-qualification tests on sign sheeting for State contract purchasing.

... Administered the statewide Section 205 Pavement Marking Demonstration Programs under the Highway Safety Program. Provided technical advice to field staff.

... Completed the "Before and After" Spot Speed Studies Summary to increase the speed limit on rural Interstate to 65 MPH.

... Completed the Fedral-aid Railroad Grade Crossing Improvement Program list for Transportation Improvement Program.

... Coordinated the Annual Traffic Engineering and Traffic Services, meetings prepared the Branch's annual report; and prepared quarterly work output and Cost Management reports.

... Handled the purchase of microcomputer systems. Provided technical assistance and training for these computers. Handled installation of hardware and software for personal computers, terminals, and high speed printers.

... Coordinated computer training program for new employees.

... Implemented various computer applications.

DESIGN REVIEW

Activities and Accomplishments:
The Design Review staff reviews shopping center driveway plans for safety, capacity, and overall traffic operations.

The efficiency and safety of a street or highway depends largely upon the amount and character of interference of vehicles moving along the roadway (interference meaning vehicles leaving or crossing the road, or standing nearby.)

In order to protect the traveling public and to fully utilize the potential of the highway investment, it is necessary to regulate the vehicle movements into and out of roadside developments, thus aiding in minimizing the interference with the traffic stream. Driveway traffic accounts for a large percentage of the interruptions to smooth traffic flow. In light of the above, the Design Review staff is concerned with the special review of driveway connections onto the State Highway System. They review design elements of location, spacing, sight distance, throat width, radii angles, declaration lanes, and grades. These elements greatly influence the operating characteristics and level of service on adjacent highways.

The Design Review Function is coordinated with Roadway Design Unit, Planning and Research Branch, Area Traffic Engineers and FHWA when special problems arise during the design stages of special commercial permits.

The Design Review Squad completed the following tasks in 1987:

... 155 Special Commercial Driveway Permits were reviewed with the Highway Design Branch, Planning and Research Branch, and the Area and Division Traffic Engineers.

... 75 roadway project plans were reviewed in conjunction with the Area Traffic Engineers.

ACCIDENT STUDIES

Activities and Accomplishments:
The Accident Studies staff identifies and selects hazardous locations which have the greatest potential for accident reduction. The staff also maintains and updates railroad grade crossing inventory and location maps. The staff maintains the traffic ordinances, primary route changes and municipal agreements.

This section accomplished the following in 1987:

... Completed 2,060 routine and special requests for accident data. Of these requests, 57 were for collision diagrams, 22 "Before and After" Studies and 1,981 were for other traffic accident studies.

... Continued to update and correct errors in the original American Association of Railroads - Federal Highway Administration Grade Crossing Inventory and maintained the Railroad-Highway Grade Crossing Location maps.

... Completed a list of secondary road bridges with more than 3 bridge accidents in 3 years.

... Handled the processing of approval of all traffic Highway ordinances on the State Highway System.

... Handled the processing of 18 route changes.

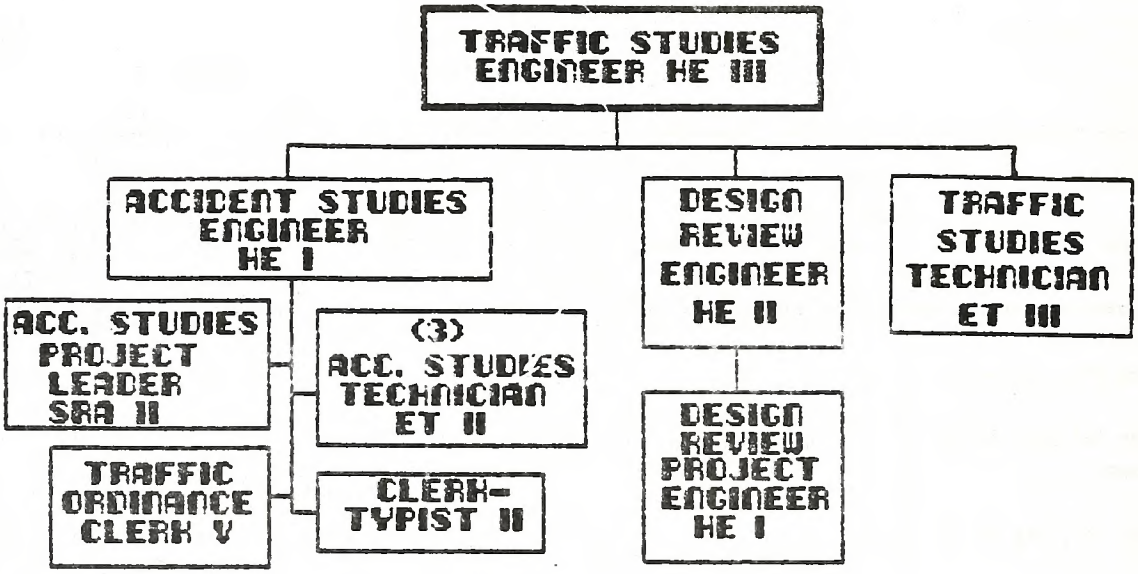
... Handled the processing of 50 speed zone ordinances to increase the speed limit on rural Interstate to 65 MPH.

An accident study was completed on all of the Interstate to help determine what sections should have their speed limit increased. Critical Accident Rates were one of the determining factors.

... Continue to monitor twin-trailer and mobile home Accidents.

TRAFFIC STUDIES UNIT

ACTIVITY DESCRIPTION	1983 JAN. -JUN	1983 JULY -DEC. (TOTAL)	1984 JAN. -JUN	1984 JULY -DEC. (TOTAL)	1985 JAN. -JUN	1985 JULY -DEC. (TOTAL)	1986 JAN. -JUN	1986 JULY -DEC. (TOTAL)	1987 JAN. -JUN	1987 JULY -DEC. (TOTAL)
1. Project Plans Reviewed		0		178		162		125		155
2. Regular Driveway Permit Reviews		37		25		46		15		0
3. Special Driveway Permit		130		161		189		111		75
4. Municipal Speed Zone Additions & Deletions	112	73 185	78	149 227	93	108 201	139	119 258	113	261 374
5. Rural Speed Zone Addition & Deletions	361	444 805	346	509 855	409	438 847	908	473 1381	511	908 1419
6. Other Additions & Deletions	752	857 1609	752	857 1609	636	710 1346	636	596 1232	511	804 1315
7. Collision Diagrams Prepared	133	128 261	75	128 203	10	71 81	2	17 19	29	28 57
8. Before and After Studies Prepared	23	0 23	30	137 167	37	40 77	29	11 40	12	10 22
9. Rates Calculated for Tentative Safety Program	810	0 810	765	0 765	746	0 746	324	419 743	0	0 0
10. Other Accident Studies Prepared	416	524 940	454	344 798	554	519 1073	539	746 1285	1224	757 1981



ORGANIZATION CHART
TRAFFIC STUDIES UNIT

FIELD SUPPORT SQUAD

Purpose:
The purpose of the Field Support Squad is to provide staff engineering assistance to the Assistant State Traffic Engineer (Field Operations). This squad coordinates the Spot Safety Program, the Fedral-Aid Hazard Elimination Program for the TIP, and the handling of requests received from the public and other sources related to traffic controls.

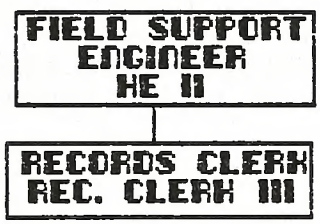
Personnel:
This squad is consists of the Field Support Engineer (HEII) and the Traffic Records Clerk (Clerk III).

Organization Changes:
The Traffic Ordinances Clerk was transferred to the Traffic Studies Unit during calendar year 1987.

Activities and Accomplishments:
This squad prepared the monthly Spot Safety Program for submittal to the Board of Transportation for approval, prepared quarterly and special reports to the State Highway Administrator on the status of the Spot Safety for the Transportation Improvement Program update, prepared reports to and for the Division of Highway Administrative staff concerning Traffic Engineering related matters, received complaints and requests from and prepared reports to the public, and coordinated Traffic Engineering Branch Field Operations activities with Technical Operations and other Highway activities.

FIELD SUPPORT SQUAD

ACTIVITY DESCRIPTION	1983 JAN.-JUN	1983 JULY-DEC. (TOTAL)	1984 JAN.-JUN	1984 JULY-DEC. (TOTAL)	1985 JAN.-JUN	1985 JULY-DEC. (TOTAL)	1986 JAN.-JUN	1986 JULY-DEC. (TOTAL)	1987 JAN.-JUN	1987 JULY-DEC. (TOTAL)
1. Requests Logged IN	237	357 594	295	331 626	306	332 638	304	270 574	267	262 529
2. Traffic Volumes Requested	162	298 460	270	261 531	339	312 651	658	312 970	87	189 276
3. Work Orders Processed	49	68 117	97	90 187	74	141 215	122	178 300	151	163 314



ORGANIZATION CHART
FIELD SUPPORT SQUAD

AREA TRAFFIC ENGINEERING UNITS

Purpose:
The Area Traffic Engineering Units are responsible for investigating and implementing Safety Programs; investigating and processing requests and complaints regarding traffic matters on State Highways; and providing traffic engineering services on a statewide basis through the three Area Traffic Engineering offices (that coordinate with the 14 Division Traffic Engineers). Some of the detailed responsibilities of these Traffic Engineers are:

... Investigating accident locations and recommending treatment to eliminate safety hazards; and investigating fatal traffic accident sites to determine if immediate safety improvement measures are required.
... Formulating safety improvement projects for possible future funding through any available Highway Safety Programs.
... Providing accident data when requested.
... Investigating and reporting information regarding traffic accidents involving roadway safety design features (i.e. breakaway sign supports, guardrail terminal sections, crash attenuators, etc.).
... Providing information regarding FHSA improvement locations, N.C. DOT's Safety Program, etc.

Personnel:
Each of the three Area Traffic Engineering Units is headed by an Area Traffic Engineer with an office located strategically within his area. Each Area Traffic Engineer has a staff of one or more Traffic Engineers, with a total of ten Highway Engineers throughout the State to carry on the necessary field operations. The Traffic Engineers are based either in the Area office or in offices located within the Area. Each Area Traffic Engineer is responsible for the Branch's field operations in approximately one-third of the State.

Organization Changes:
None.

These three Areas are assigned the 14 Divisions in the following manner:

Area 1 consists of Divisions 1-5. The main office is located in Wilson. An engineering office is in Durham.

Area 2 consists of Divisions 6-10. The main office is located in Winston-Salem. An engineering office is in Fayetteville.

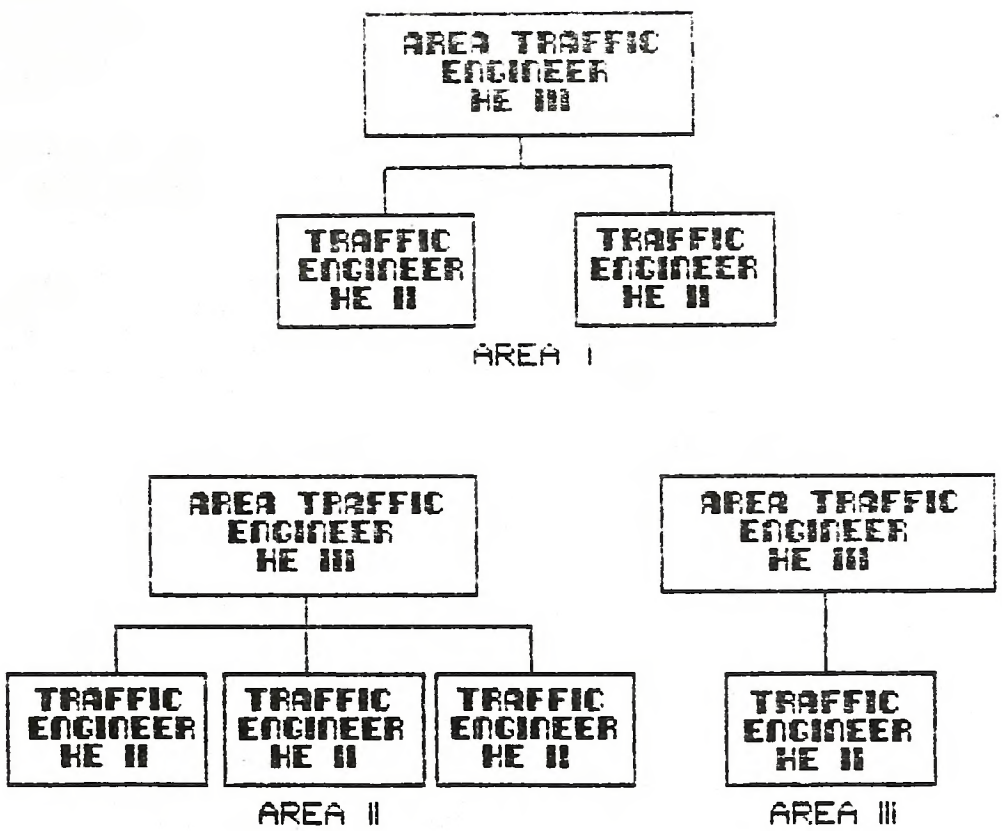
AREA 3 covers Divisions 11-14 with the main office in Asheville.

Area Traffic Engineering Units

ACTIVITY DESCRIPTION	AREA 1 JAN.-JUN	AREA 1 JULY-DEC	AREA 1 TOTAL	AREA 2 JAN.-JUN	AREA 2 JULY-DEC	AREA 2 TOTAL	AREA 3 JAN.-JUN	AREA 3 JULY-DEC	AREA 3 TOTAL
1. Urban Speed Zones	41	25	66	22	63	85	10	7	17
2. Rural Speed Zones	61	54	115	74	149	223	66	30	36
3. School Investigations (Cross-speed zones, etc.)	17	14	31	2	11	13	4	0	4
4. Intersection Studies	158	163	321	55	64	119	14	8	22
5. Regulatory Signs	30	40	70	45	18	63	1	1	2
6. Guide Sign Investigations	41	39	80	71	38	109	14	12	26
7. Warning Signing Investigations	105	77	182	10	12	22	0	0	0
8. Plan Reviews	49	73	122	33	30	63	18	19	37
9. Crossover Investigations	71	69	140	22	14	36	11	4	15
10. Route Changes	2	3	5	4	1	5	4	0	4
11. Hazardous Location Investigations Non-Safety Program	21	38	59	38	31	69	0	0	0
12. Special Commercial Driveway Permit Review	24	65	89	10	9	19	17	9	26
13. Rural Safety Program Investigations	15	16	31	3	6	9	2	12	14
14. Urban Safety Program Inventory	22	52	74	3	0	3	19	19	38
15. Railroad Crossing Studies	38	64	102	11	64	75	4	2	6
16. Encroachment Contracts	2	5	7	1	2	3	0	0	0
17. Traffic Signal Investigations	214	178	392	94	117	211	53	64	117
18. Pavement Marking Investigatns	113	105	218	13	15	28	3	4	7
19. Other Field Investigations	48	84	132	55	37	92	34	20	54
20. Fatal Accident Locat. Studies	140	68	208	15	11	26	42	34	76
21. Pavement Marking Studies	85	64	149	1	1	2	0	0	0

Area Traffic Engineering Units

ACTIVITY DESCRIPTION	AREA 1 JAN. -JUN	AREA 1 JULY -DEC	AREA 1 TOTAL	AREA 2 JAN. -JUN	AREA 2 JULY -DEC	AREA 2 TOTAL	AREA 3 JAN. -JUN	AREA 3 JULY -DEC	AREA 3 TOTAL
22. Channelization	35	20	55	0	1	1	0	0	0
23. Breakaway Signs, Guardrail, Accidents, etc.	2	1	3	3	4	7	0	0	0
24. Curve Delineation Studies	12	10	22	4	0	4	0	0	0
25. Truck Route & Spot Speed Studies	30	30	60	3	23	26	4	2	6
26. Special Events (foot, bike, boat races, etc.)	1	1	2	0	2	2	0	0	0



ORGANIZATION CHART
AREA TRAFFIC ENGINEERING UNITS

DIVISION TRAFFIC SERVICES UNITS

Purpose:
The Division Traffic Services Units install and maintain traffic control devices including signs, signals, and pavement markings throughout the state; and work closely with the Traffic Engineering Branch providing technical advice, manpower, and equipment in implementing various traffic and safety programs.

Personnel:
The Division Traffic Services Units are directly staffed to their respective Division Engineer. They are normally composed of: a Division Traffic Engineer, a Traffic Services Supervisor, 8 Sign Erection Crews, 2-5 Traffic Control Technicians, and 3 Pavement Marking Crews.

Activities and Accomplishments:
During the past year, these units installed and maintained the traffic control devices on State roads. These traffic control devices are divided into three categories: signs, signals, and markings.

Signs: Each Division normally has 8 sign erection crews. These crews erect and maintain signs along the State highways in their respective Division.

Signals: The approximately 5000 traffic signals on State maintained highways are the responsibility of the Traffic Control Technicians in each Division. These technicians coordinate the installation of new signals and are often found repairing damaged signals at any hour of the day or night.

Markings: The Units paint center lines and edge lines on nearly 59,000 miles of paved roadways. Most of the painting is done in the spring, summer and fall months. Approximately 1,000,000 gallons of paint are applied each year.

The Division Traffic Engineer manages and supervises the Traffic Services Unit. Some of his duties are as follows:

... Investigating and responding to all complaints and requests received for traffic operations and safety improvements.

... Evaluating all engineering data necessary to arrive at engineering decisions. This data may include traffic counts, accident studies, delay studies, parking studies, speed studies, etc.

... Preparing plans and supervising the installation of minor traffic engineering improvements; coordinating the installation of traffic control devices to assure compliance with plans and specifications; and supervising the implementation of timing plans for all traffic control signals.

.. Designing preliminary sketches to alleviate major traffic problems.

... Assisting the District Engineer in the technical review of all regular driveway permits.

... Developing and maintaining good public relations in dealing with private citizens, various officials, and DOT representatives; and providing city officials with as much technical advice and assistance as possible.

... Reviewing and checking channelization fund work orders and seeing that work is proceeding in an orderly manner.

... Reviewing all traffic engineering functions as they relate to safety and conformity to policies.

... Reviewing construction project plans and providing estimates for needed traffic control devices.

PROFESSIONAL ACTIVITIES

By encouraging its personnel to participate in professional activities and to work toward professional and educational advancement, the Traffic Engineering Branch hopes to cultivate individual professionalism and thereby develop the full potential of the organization.

During this year, Traffic Engineering Branch personnel served on the following committees and/or offices:

AASHTO Traffic Engineering Sub-Committee
ITE - Student Chapter Guest Speaker
ITRE Task Force on Traffic Control Devices
NC DOT - CADD User's Group
NC DOT-Maintainance Management Task Force
NCDSSITE- President
NCSSITE- Instructor
NCSSITE- Planning Committee
I-40 Task Force
City of Fayetteville - Consultant Selection Committee
Traffic Services Task Force Pavement Marking Subcommittee
ASCE Sub-Committee on Pavement Marking

Additionally, branch personnel participated in the following professional meetings and conferences:

AASHTO National Meeting
CCCASCE Annual Meeting
Construction Engineers Conference
ITE Annual Meeting
ITE National Meeting
NCSSITE Quarterly Meetings
NCSSITE-Joint Conference on Public Transportation
SSITE Annual Meeting
TEB Annual Meeting
Traffic Services Supervisor's Meeting
ASCE Meeting on Microcomputers in Transportation
Pavement Marking and Signing Meeting
Traffic Signal Closed Loop Signal Systems

In order to maintain or improve their professional standing and effectiveness, the following seminars and training activities were attended:

Construction Maintenance Workshop
Design and Operation of Work Zone Traffic Control Training Workshop
Design Considerations in Rehab. & Reconstruction of Urban Freeways
EIT Exam Review
Elements of Railway Signaling and Control Systems
Highway Capacity Workshop- ITRE
ITE Joint Transportation Officials Workshop
Lotus 1-2-3
Microcomputer Workshop
National Highway & Transportation Management Program
NC DOT Personnel Management
PE Exam Review
Quality Circles
Traffic Engineering Technician's Workshop
Traffic Signal Systems Workshop- GTU
Writing Skills for Transportation Professionals
Manager's Course on CADD
ITE Workshop on Sigal Timing
Urban Street System Design Workshop

REGISTERED PROFESSIONAL ENGINEERS

Bivens, N.R.
Blount, E.B.
Crowe, N.C., Jr.
Deaver, P.G.
Eason, G.A.
Gettier, G.L.
Goode, C.B., Jr.
Grigg, G.G., Jr.
Kimley, R.J.
Lynch, J.M.
Mallard, E.F.
Milam, K.E.
Permar, J.F.
Robertson, D.W.
Sessoms, C.C., Jr.
Smart, W.D.
Steelman, H.M.
Ward, W.A.
Watson, W.J.
Williams, L.T.

CERTIFIED ENGINEERING TECHNICIANS

Kellenberger, J.W.

PROFESSIONAL ORGANIZATION MEMBERSHIPS

NAME	ITE	SSITE	NCDSSITE	NSPE	PENC	REC	ASCE	NCSASCE
Bivens, N.R., P.E.			AF					
Blount, E.B., P.E.,RLS *	F	M	M	M	M	M		
Boyles, G.S.	A		M					
Braswell, W.M.			AF					
Canales, R.			M					
Crowe, N.C., Jr., P.E.	M	M	M					
Deaver, P.G., P.E., RLS			AF					
Eason, G.A., P.E.		M	M					
Eddins, L.M.			AF					
Evans, C.L.			AF					
Gettier, G.L., P.E.			AF	M	M			
Grigg, G.G., Jr., P.E.		AF						
Jeffreys, T.			AF					
Justice, H.A.		M	M					
Kilmley, R.J., P.E.	L	M	M	M	M	M	F	M
Lynch, J.M., P.E.	F	M	M				M	M
Oldham, M.W.			AF					
Robertson, D.W., P.E. **	A	M	M	M	M		M	M
Rosendahl, J.F.	M	M	M					
Satterwhite, H.L., Jr.			AF					
Sessoms, Jr., P.E.		PAF	AF	M	M			
Shaw, J.W.			AF					
Smith, S.K.			AF					
Stamp, J.L.		PAF	AF					
Sultan, O.S.			AF					
Ward, W.A., P.E.		PAF	AF					
Watson, W.J., P.E.	M	M	M					
Webb, D.W.	A	M	M					
Williams, L.T.	A	M	M					

* NSCE also.

** NCLUC, NCPTA, & SCSA also.

Abbreviations for the above organizations:

ASCE - American Society of Civil Engineers
NCSASCE - N.C.Section of the American Society of Civil Engineers
ITE - Institute of Transportation Engineers
NCDSSITE - North Carolina Division of the Southern Section of Institute of Transportation Engineers
NCLUC - North Carolina Land Use Congress
NCPTA - North Carolina Public Transportation Association, Inc.
NCSE - North Carolina Society of Engineers
NSPE - National Society of Professional Engineers
PE - Registered Professional Engineer
PENC - Professional Engineers of North Carolina
REC - Raleigh Engineering Club
RLS - Registered Land Surveyor
SSITE - Southern Section Institute of Transportation Engineers
SCSA - Soil Conservation Society of America

L - Life M - Member AF - Affilliate
F - Fellow A - Associate Member PAF - Professional Affilliate

We are proud of the wealth of experience in the field of Traffic Engineering possessed by our Staff. We are also proud of these employees who have been a part of our Traffic Engineering family for so many years.

YEARS OF SERVICE IN TRAFFIC ENGINEERING BRANCH

30+ Years	15+ years	5+ Years
Blount, E.B.	Crowe, N.C., Jr.	Bailey, L.H.
	Eddins, L.M.	Braswell, W.M.
25+ Years	Evans, T. M.	Canales, R.
	Gettier, G.L.	Cranford, J.C.
Deaver, P.G.	Goode, C.B., Jr.	Kimley, R.J.
Sessoms, Jr., C.C.	Johnson, B.R.	Sellew, J.E.
Wilkins, J.R.	Kellenberger, J.W.	Whitfield, W.A., Jr.
	Mallard, E.F.	
20+ years	Murray, F.A.	
	Oldham, M.W.	
Baker, D.H.	Parker, G.E.	
Butler, E.B.	Peoples, T.A.	
Cauley, R.E.	Permar, J.F.	
Grigg, G.G.	Shaw, J.W.	
Harris, T.	Todd, I.G.	
Jeffreys, T.	Webber, R.L., Jr.	
Lynch, J.M.	Wilson, Y.G.	
Milam, K.E.		
Moody, S.E.	10+ Years	
Rosendahl, J.F.		
Smith, S.K.	Stanley, D.G.	
Stafford, Jr., E.Y.	Dix, S.B.	
Steelman, Jr., H.M.		
Watson, W.J.		

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